STIC Search Report
EIC 2800

USPTO

STIC Database Tracking Number: 189950

TO: Eric W Thomas
Location: jef 10d19
Art Unit: 2831
Friday, May 19, 2006

Case Serial Number: 10/534703

From: Mary S. Mims
Location: STIC-EIC2800
JEF-4B59
Phone: 25928
Email: Mary.Mims@uspto.gov

Search Notes

Examiner Eric Thomas,

Please find attached results of your search for 10/534703. The search was conducted using databases on STN for microstructures. The tagged documents appear to be the closest documents located during our search. Please review all of the results.

Based on this, if you have questions or would like a refocused search, please contact me.

Thanks

Mary S. Mims

Mary S. Mims

Search and Information Resources Administration

STIC Search Results Feedback Form

EIC 2800

Questions about the scope or the results of the search? Contact ***the EIC searcher or contact***:

Jeff Harrison, EIC 2800 Team Leader
571-272-2511, JEF 4B68

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* ☐ *Example: 2810*

- *Relevant prior art **found**, search results used as follows:*
  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

  Types of relevant prior art found:
  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)

- *Relevant prior art **not found:***
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to STIC/EIC2800, CP4-9C18

sira
Search and Information Resources Administration

Rcvd 5/15/06 2:30

189950

SEARCH REQUEST FORM **Scientific and Technical Information Center - EIC2800**
Rev. 3/15/2004 This is an experimental format -- Please give suggestions or comments to Jeff Harrison, JEF-4B68, 272-2511.

Date 5/15/06 Serial # 10/534703 Priority Application Date 11/18/02

Your Name Eric Thomas Examiner # 76204

AU 2831 Phone 2-1985 Room 10D19

In what format would you like your results? Paper is the default. PAPER DISK EMAIL

If submitting more than one search, please prioritize in order of need.

The EIC searcher normally will contact you before beginning a prior art search. If you would like to sit with a searcher for an interactive search, please notify one of the searchers.

Where have you searched so far on this case?
Circle: USPT DWPI EPO Abs JPO Abs IBM TDB
Other:

What relevant art have you found so far? Please attach pertinent citations or Information Disclosure Statements. See Attached E.P. Document.

What types of references would you like? Please checkmark:

Primary Refs X Nonpatent Literature X Other
Secondary Refs X Foreign Patents X
Teaching Refs X

What is the topic, such as the **novelty**, motivation, utility, or other specific facets defining the desired **focus** of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract and pertinent claims.

☆ Nb-Al Powder comprising A) dendritic microstructures principally containing $NbAl_3$, Nb_2Al, Nb_3Al, or Nb and B) matrices containing Al or eutectic structures containing at least two selected from the group $NbAl_3$, Nb_2Al, Nb_3Al, Nb; the particles are covered with an oxide (dielectric) and the matrices surrounding the dendritic microstructures.

☆ The method according to claim 12.

Thanks

Staff Use Only

Searcher: M. Mims
Searcher Phone: 25928
Searcher Location: STIC-EIC2800, JEF-4B68
Date Searcher Picked Up: 5/19/06
Date Completed: 5/19/06
Searcher Prep/Rev Time: 300
Online Time: 30.60

Type of Search
Structure (#) ✓
Bibliographic ✓
Litigation
Fulltext
Patent Family
Other

Vendors
STN ✓
Dialog
Questel/Orbit
Lexis-Nexis
WWW/Internet
Other

Thomas, Eric W.

From: Spar, Steven
Sent: Monday, May 15, 2006 11:59 AM
To: Thomas, Eric W.
Subject: RE: Can you help me out.

Hi Eric,

The '806 reference mentions an Al-Nb alloy on the upper right column of page 2, and the '212 reference mentions an Al-Nb alloy on the lower left column of page 2, but neither mention dendrite microstructures or capacitors.

Steve Spar
Technical Translator, Translations Branch
Madison West 1A79
Phone: (571) 272-2574
Fax: (571) 273-2574

-----Original Message-----
From: Thomas, Eric W.
Sent: Monday, May 15, 2006 11:22 AM
To: Spar, Steven
Subject: Can you help me out.

Steve,

Good morning. I was wondering if you could take a look at:

JP 60-066806 A -- does it say anything about a nb-al (niobium aluminum) alloy on page 2 lower right column, page 3 upper right column, claims?

JP 01-124212 -- does it say anything about a nb-al (niobium aluminum) alloy on page 2 lower part, page 3 upper right column, claims?

If the alloy is discussed... do the references discuss "dendrite microstructures"/capacitors?

Thanks,

Eric

Eric W. Thomas
Primary Patent Examiner
United States Patent & Trademark Office
Jefferson 10 D 19 -- Art Unit 2831
(571) 272-1985

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=> d his full

     (FILE 'CAPLUS' ENTERED AT 15:12:09 ON 19 MAY 2006)
                DELETE HIS

     FILE 'REGISTRY' ENTERED AT 15:14:35 ON 19 MAY 2006
L1            1 SEA ABB=ON  PLU=ON  AL3 NB/MF
L2            1 SEA ABB=ON  PLU=ON  AL NB2/MF
L3            1 SEA ABB=ON  PLU=ON  AL NB3/MF
L4       133569 SEA ABB=ON  PLU=ON  NB/ELS

     FILE 'CAPLUS' ENTERED AT 15:21:36 ON 19 MAY 2006
L5           44 SEA ABB=ON  PLU=ON  L1 AND L2 AND L3 AND L4
                E CAPACITORS/CT
                E E3+ALL
                SET LINE 250
                SET DETAIL OFF
                E CAPACITORS+ALL/CT
                SET LINE LOGIN
                SET DETAIL LOGIN
L6        71782 SEA ABB=ON  PLU=ON  (CAPACITOR OR  "ELECTRIC CONDENSERS" OR
                "CERAMIC CAPACITORS" OR "ELECTRIC CAPACITORS" (L) "CERAMIC,
                MULTILAYER" OR "ELECTRIC CAPACITORS" (L) "SEMICONDUCTIVE" OR
                "ELECTROLYTIC CAPACITORS")
L7            1 SEA ABB=ON  PLU=ON  L5 AND L6
                D IBIB ABS HITSTR

     FILE 'REGISTRY' ENTERED AT 15:30:37 ON 19 MAY 2006
L8          313 SEA ABB=ON  PLU=ON  AL.NB/MF

L9           49 SEA ABB=ON  PLU=ON  AL NB/ELF

     FILE 'CAPLUS' ENTERED AT 15:32:48 ON 19 MAY 2006
L10        2027 SEA ABB=ON  PLU=ON  L8 OR L9
L11          28 SEA ABB=ON  PLU=ON  L6 AND L10
L12          27 SEA ABB=ON  PLU=ON  L11 NOT L7
                D IBIB ABS HITSTR 1-27

     FILE 'INSPEC, COMPENDEX' ENTERED AT 15:38:32 ON 19 MAY 2006
L13        1343 SEA ABB=ON  PLU=ON  (NBAL3 OR NB2AL OR NB3AL OR NB3AL)/ET
L14           1 SEA ABB=ON  PLU=ON  L6 AND L13
                D IALL
L15        1465 SEA ABB=ON  PLU=ON  (NBAL3 OR NB2AL OR NB3AL OR NB3AL OR
                NBAL)/ET
L16           2 SEA ABB=ON  PLU=ON  L6 AND L15
L17           1 SEA ABB=ON  PLU=ON  L16 NOT L14
                D IALL

     FILE 'WPIX' ENTERED AT 15:44:51 ON 19 MAY 2006
L18         231 SEA ABB=ON  PLU=ON  NBAL3 OR NB2AL OR NB3AL OR NB3AL OR NBAL
                OR NEODYMIUM(W)(ALUMINUM OR ALUMINIUM)
L19           4 SEA ABB=ON  PLU=ON  L18 AND L6
                D IFULL 1-4

     FILE 'CAPLUS' ENTERED AT 15:53:23 ON 19 MAY 2006
L20          44 SEA ABB=ON  PLU=ON  L5 NOT L12
                E DENDRITIC/CT
                E E2+A
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                E DENDRITIC/CT
                E E2+ALL
                SET LINE 250
                SET DETAIL OFF
                E DENDRITES+ALL/CT
                SET LINE LOGIN
                SET DETAIL LOGIN
                SET LINE 250
                SET DETAIL OFF
                E MICROSTRUCTURE+ALL/CT
                SET LINE LOGIN
                SET DETAIL LOGIN
L21       18427 SEA ABB=ON  PLU=ON  DENDRITES OR CRYSTAL(W)NEDDLE OR DENDRIT?(4
                W)((MICROSTRUCTURE OR "POLE FIGURES" OR "TEXTURE" OR "AMORPHOUS
                 STATE" OR "AMORPHOUS STRUCTURE" OR "GLASS STRUCTURE" OR
                "GLASSY STATE" OR "VITREOUS STATE" OR "AUSTENITIC STRUCTURE"
                OR "AUSTENITE"))
L22           1 SEA ABB=ON  PLU=ON  L20 AND L21
                D IBIB ABS HITSTR
L23      383434 SEA ABB=ON  PLU=ON  DENDRITES OR CRYSTAL(W)NEEDLE OR ((MICROSTR
                UCTURE OR "POLE FIGURES" OR "TEXTURE" OR "AMORPHOUS STATE" OR
                "AMORPHOUS STRUCTURE" OR "GLASS STRUCTURE" OR "GLASSY STATE"
                OR "VITREOUS STATE" OR "AUSTENITIC STRUCTURE" OR "AUSTENITE"))
L24           8 SEA ABB=ON  PLU=ON  L20 AND L23
L25           7 SEA ABB=ON  PLU=ON  L24 NOT L22
                D IBIB ABS HITSTR 1-7
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L12 ANSWER 8 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:78331 CAPLUS
DOCUMENT NUMBER: 140:137728
TITLE: Electrolytic **capacitor** and a fabrication method therefor
INVENTOR(S): Yano, Mutsumi; Takatani, Kazuhiro; Kimoto, Mamoru
PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan
SOURCE: U.S. Pat. Appl. Publ., 12 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 2004016978	A1	20040129	US 2003-611969		20030703
US 6876083	B2	20050405			
JP 2004349658	A2	20041209	JP 2003-175955		20030620
TW 225656	B1	20041221	TW 2003-92118048		20030702
CN 1474422	A	20040211	CN 2003-133189		20030725
PRIORITY APPLN. INFO.:			JP 2002-217482	A	20020726
			JP 2003-80792	A	20030324

AB An electrolytic **capacitor** of the invention includes one type of electrode selected from a group consisting of an electrode of at least one type of alloy selected from a group consisting of niobium alloy, titanium alloy, and tungsten alloy, an electrode of mixed sinter of niobium and aluminum, or a fluorine-doped electrode of niobium or niobium alloy and on a surface of the each electrodes a dielec. layer is formed by anodizing the electrode.

IT **39396-75-3**
RL: DEV (Device component use); USES (Uses)
(design of electrolytic **capacitor** and a method of its fabrication)

RN 39396-75-3 CAPLUS

CN Aluminum alloy, nonbase, Al,Nb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Al	7429-90-5
Nb	7440-03-1

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L12 ANSWER 9 OF 27 CAPLUS

ACCESSION NUMBER:	2003:890033 CAPLUS
DOCUMENT NUMBER:	139:384501
TITLE:	Manufacture of Al-Nb alloy foil for electrolytic **capacitor**
INVENTOR(S):	Kawabata, Hiroyuki; Tsukuda, Ichizo
PATENT ASSIGNEE(S):	Showa Denko K. K., Japan
SOURCE:	Jpn. Kokai Tokkyo Koho, 12 pp. CODEN: JKXXAF
DOCUMENT TYPE:	Patent
LANGUAGE:	Japanese
FAMILY ACC. NUM. COUNT:	1
PATENT INFORMATION:	

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	JP 2003321762	A2	20031114	JP 2002-125637	20020426
PRIORITY APPLN. INFO.:				JP 2002-125637	20020426

AB An Al-Nb alloy foil (thickness: 20-500 μm) is manufactured by rapid solidification of molten alloy on a cooling roll under a N-containing atmospheric As a result, the Al-Nb intermetallic compound particles on the foil are nitrided to form a surface film of Al-Nb-N. The obtained foil is suitable for electrolytic **capacitor** application with reduced current leakage.

IT **39309-34-7 81318-84-5 107240-82-4**
111235-60-0, Aluminum 5, niobium 95 **121165-63-7**,
Aluminum 93, niobium 7 **121165-65-9**, Aluminum 88, niobium 12
178275-74-6, Aluminum 15, niobium 85
RL: NUU (Other use, unclassified); USES (Uses)
(manufacture of Al-Nb alloy foil for electrolytic **capacitor**)

RN 39309-34-7 CAPLUS
CN Aluminum alloy, base, Al 97,Nb 3 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	97	7429-90-5
Nb	3	7440-03-1

RN 81318-84-5 CAPLUS
CN Aluminum alloy, base, Al 95,Nb 5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	95	7429-90-5
Nb	5	7440-03-1

RN 107240-82-4 CAPLUS
CN Aluminum alloy, base, Al 98,Nb 2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	98	7429-90-5
Nb	2	7440-03-1

RN 111235-60-0 CAPLUS
CN Niobium alloy, base, Nb 95,Al 5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	95	7440-03-1
Al	5	7429-90-5

RN 121165-63-7 CAPLUS
CN Aluminum alloy, base, Al 93,Nb 7 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	93	7429-90-5
Nb	7	7440-03-1

RN 121165-65-9 CAPLUS
CN Aluminum alloy, base, Al 88,Nb 12 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	88	7429-90-5
Nb	12	7440-03-1

RN 178275-74-6 CAPLUS
CN Niobium alloy, base, Nb 85,Al 15 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	85	7440-03-1
Al	15	7429-90-5

L12 ANSWER 11 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2002:143037 CAPLUS
DOCUMENT NUMBER: 136:192880
TITLE: Niobium powder, sinter thereof, and **capacitor** employing the same
INVENTOR(S): Omori, Kazuhiro; Naito, Kazumi
PATENT ASSIGNEE(S): Showa Denko K.K., Japan
SOURCE: PCT Int. Appl., 115 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
WO 2002015208	A1	20020221	WO 2001-JP6857		20010809
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW					
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG					
CA 2418865	AA	20020221	CA 2001-2418865		20010809
AU 2001077734	A5	20020225	AU 2001-77734		20010809
EP 1324359	A1	20030702	EP 2001-955623		20010809
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR					
BR 2001013215	A	20050201	BR 2001-13215		20010809
RU 2267182	C2	20051227	RU 2003-105884		20010809
US 2002064476	A1	20020530	US 2001-925686		20010810
US 6652619	B2	20031125			
US 2003205106	A1	20031106	US 2003-341229		20030113
PRIORITY APPLN. INFO.:			JP 2000-243486	A	20000810
			JP 2000-384720	A	20001219
			JP 2001-65852	A	20010309
			JP 2001-174018	A	20010608
			US 2000-240828P	P	20001017
			US 2001-269855P	P	20010221
			US 2001-275467P	P	20010314
			US 2001-297441P	P	20010613
			WO 2001-JP6857	W	20010809
			US 2001-925686	A1	20010810

AB A Nb powder containing at least one element selected from the group consisting of Cr, Mo, W, B, Al, Ga, In, Tl, Ce, Nd, Ti, Re, Ru, Rh, Pd, Ag, Zn, Si, Ge, Sn, P, As, Bi, Rb, Cs, Mg, Sr, Ba, Sc, Y, La, Pr, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, V, Os, Ir, Pt, Au, Cd, Ag, lead, Se, and Te; a sinter of the Nb powder; and a **capacitor** which comprises the sinter serving as one electrode, a dielec. formed on the sinter, and the other electrode disposed on the dielec.

IT **57720-22-6**
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(sintering niobium alloy powders in manufacture of **capacitors**)

RN 57720-22-6 CAPLUS

CN Niobium alloy, base, Nb 100,Al 0.3 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	100	7440-03-1
Al	0.3	7429-90-5

REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L12 ANSWER 13 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:505697 CAPLUS
DOCUMENT NUMBER: 133:180971
TITLE: Electro-discharge consolidation (EDC) applied to nanocrystalline and RSP/MA powders
AUTHOR(S): Okazaki, K.
CORPORATE SOURCE: Department of Chemical and Materials Engineering, University of Kentucky, Lexington, KY, 40506-0046, USA
SOURCE: Materials Science & Engineering, A: Structural Materials: Properties, Microstructure and Processing (2000), A287(2), 189-197
CODEN: MSAPE3; ISSN: 0921-5093
PUBLISHER: Elsevier Science S.A.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB EDC was applied to consolidate nanocryst. intermetallic powders and rapid solidification processing (RSP) Al alloy powders. Because EDC employs a high-voltage, high-d. current pulse discharged from a **capacitor** bank to powders under external pressure, one can take advantage of the basic characteristics of EDC to preserve the microstructure inherent in the starting powder, remove oxide films on the prior powder particle surface to enhance the bonding, densify to the bulk and thereby improve the mech. properties. Mech. alloyed Nb-23 atomic% Al was consolidated to a d. of 99% theor., and the nanocryst. state (<35 nm grain size) was preserved. Because of such a small grain size, the EDC consolidates exhibit a neg. Hall-Petch relation. Another example is presented for RSP and MA powders of an Al alloy, in which the magnitude of ductilities exhibited by EDC bulks clearly indicates that the oxide film on the powder particle surface was completely removed.

IT **88872-57-5P**, Aluminum 23, niobium 77 (atomic)
RL: PNU (Preparation, unclassified); PREP (Preparation)
(electro-discharge consolidation applied to nanocryst. and rapid solidification processing/mech. alloyed powders)

RN 88872-57-5 CAPLUS

CN Niobium alloy, base, Nb 92,Al 8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	92	7440-03-1
Al	8	7429-90-5

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L12 ANSWER 14 OF 27 CAPLUS
ACCESSION NUMBER: 1998:121496 CAPLUS
DOCUMENT NUMBER: 128:207571
TITLE: Electro-discharge consolidation of nanocrystalline Nb-Al powders prepared by mechanical alloying
AUTHOR(S): Okazaki, Kenji
CORPORATE SOURCE: Department of Chemical and Materials Engineering, University of Kentucky, Lexington, KY, 40506-0046, USA
SOURCE: THERMEC '97, International Conference on Thermomechanical Processing of Steels and Other Materials, 2nd, Wollongong, Australia, July 7-11, 1997 (1997), Volume 2, 1379-1385. Editor(s): Chandra, T.; Sakai, T. Minerals, Metals & Materials Society: Warrendale, Pa.
CODEN: 65RAAQ
DOCUMENT TYPE: Conference
LANGUAGE: English
AB A Nb-23 atomic% Al alloy was prepared by mech. alloying. Careful deconvolution of XRD revealed that the mech. alloyed powder was a mixture of multi-phase nanocryst. (5-9 nm) Nb3Al, Nb2Al, Nb and Al. The powder under external pressure was subjected to a high-voltage, high-d. current pulse from a **capacitor** bank to produce a consolidated body having a relative d. of ≤97.5% theor. The consolidated body was still a mixture of two nanocryst. (13-33 nm) Nb3Al and Nb2Al phases. Compression tests at ambient temperature resulted in a yield strength of 826 MPa and strain to fracture of 1.9%. An increase in temperature to 1233 K resulted in a decrease in yield strength to 500 MPa but an increase in ductility to >40%. The strain rate sensitivity exponent was >0.4 and suggested that the high-temperature deformation is controlled by grain rotation or grain-boundary sliding.
IT **12003-74-6P 12003-75-7P**
RL: PNU (Preparation, unclassified); PREP (Preparation)
(electro-discharge consolidation of mech.-alloyed nanocryst. Nb-Al powders containing phase of)
RN 12003-74-6 CAPLUS
CN Aluminum, compd. with niobium (1:2) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	2	7440-03-1
Al	1	7429-90-5

RN 12003-75-7 CAPLUS
CN Aluminum, compd. with niobium (1:3) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	3	7440-03-1
Al	1	7429-90-5

IT **88872-57-5**, Aluminum 23, niobium 77 (atomic)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(electro-discharge consolidation of nanocryst. Nb-Al powders prepared by mech. alloying)
RN 88872-57-5 CAPLUS

CN Niobium alloy, base, Nb 92,Al 8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	92	7440-03-1
Al	8	7429-90-5

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L12 ANSWER 15 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1995:249068 CAPLUS
DOCUMENT NUMBER: 122:69985
TITLE: Manufacture of aluminum electrode material for electrolytic **capacitor**
INVENTOR(S): Kuroki, Tosha; Mizunuma, Susumu; Fukutani, Kazuhiko
PATENT ASSIGNEE(S): Shinnippon Seitetsu KK, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 06264201	A2	19940920	JP 1993-54241	19930315
PRIORITY APPLN. INFO.:			JP 1993-54241	19930315

AB The title method involves the following steps; laminating rapidly solidified Al alloy foils containing 1-25 atomic% Zr on the both sides of an Al foil, heating at 250-400°, one-step or multistep clad rolling with rolling draft 3-90%, and heating at 250-400°. The material showed high capacitance.

IT **106933-67-9**
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(elec. insulator; hot cladding of aluminum alloy elec. insulator and aluminum for manufacture of electrode material of electrolytic **capacitor**)

RN 106933-67-9 CAPLUS

CN Aluminum alloy, base, Al 93,Nb 6.6 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	93	7429-90-5
Nb	6.6	7440-03-1

L12 ANSWER 16 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1994:619596 CAPLUS
DOCUMENT NUMBER: 121:219596
TITLE: Chip-type solid **electrolytic capacitors** with low loss
INVENTOR(S): Mochizuki, Takashi
PATENT ASSIGNEE(S): Nichikon Kk, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp. CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 06120088	A2	19940428	JP 1992-286586	19920930
JP 3199871	B2	20010820		

PRIORITY APPLN. INFO.: JP 1992-286586 19920930

AB The **capacitors** contain two solid electrolytic **capacitor** devices comprising Al or Al-based alloy electrodes, which are etched to increase their effective areas, successively coated with anode oxide coating layers, solid electrolytic layers, and cathode conductive layers, in which anode leads are from opposite directions of the devices and cathode leads are from junctions of the devices at 90° towards the anode leads.

IT **39396-75-3**
RL: USES (Uses)
(chip-type solid electrolytic **capacitor** electrodes containing)

RN 39396-75-3 CAPLUS
CN Aluminum alloy, nonbase, Al,Nb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Al	7429-90-5
Nb	7440-03-1

L12 ANSWER 18 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1994:151577 CAPLUS
DOCUMENT NUMBER: 120:151577
TITLE: Solid electrolytic **capacitor** and its manufacture
INVENTOR(S): Saiki, Yoshihiko
PATENT ASSIGNEE(S): Nippon Electric Co, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 3 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 05243101	A2	19930921	JP 1992-73048	19920226

PRIORITY APPLN. INFO.: JP 1992-73048 19920226

AB The **capacitor** consists of an anode, obtained by press shaping powdered amorphous metals and sintering, coated with a dielec. layer, a solid electrolyte layer, a cathode metal layer, and an anode lead. The **capacitor** is manufactured by mech. milling to form powdered amorphous alloys, press shaping, sintering at lower temperature than crystallization temperature of the alloys in vacuum to form an anode, and forming a dielec. film, a solid electrolyte layer, and a cathode metal layer. The **capacitor** showed good insulation withstand voltage.

IT **39396-75-3**
RL: USES (Uses)
(amorphous, sintering of, electrolytic **capacitor** anode from, with good insulation withstand voltage)

RN 39396-75-3 CAPLUS

CN Aluminum alloy, nonbase, Al,Nb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Al	7429-90-5
Nb	7440-03-1

L12 ANSWER 19 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1992:431549 CAPLUS
DOCUMENT NUMBER: 117:31549
TITLE: Nano-crystalline consolidation of MA powders by EDC
AUTHOR(S): Kim, D. K.; Okazaki, K.
CORPORATE SOURCE: Univ. Kentucky, Lexington, KY, 40506-0046, USA
SOURCE: Materials Science Forum (1992), 88-90(Mech. Alloying), 553-60
CODEN: MSFOEP; ISSN: 0255-5476
DOCUMENT TYPE: Journal
LANGUAGE: English

AB ~~A powder~~ mixture of elemental Nb (54.5 weight%) and Al (45.5 weight%) to form NbAl3 was mech. alloyed (MA) in an Ar-filled jar mill for 25-500 h. The elemental particulate size measured from the line-broadening decreases with increasing the MA time of up to 200 h from 40 to 4 nm, while sizes are 2-7 nm. DSC studies were carried out at several heating rates to thermally analyze both the endothermic and exothermic reactions. The exothermic reaction is due to the devitrification of the amorphous which varies with the MA time, while the endothermic reaction is due to the formation of NbAl3 from both Nb2Al and a mixture recrystd. from the amorphous, exhibiting a constant activation energy of 45 kcal/mol regardless of the MA time. The energies for devitrification decreases from 42 to 37 kcal/mol with an increase in the MA time from 100 to 500 h. A high-voltage, high-d. elec. current pulse was subjected in air ~~from a~~ **capacitor** bank of 500 or 720 µF to the powders mech. alloyed ~~for 300 or 500 h un~~der 207 to 483 MPa, instantaneously producing a solid compact of mostly NbAl3. The resultant grain size of elec.-discharge-compacted (EDC) compacts produced at 22-100 nm. A Hall-Petch relation exists between microhardness (10,000-12,000 MPa) and square root of grain size up to .apprx.60 nm. When grain sizes are further reduced from 60 nm, however, softening actually occurs with a decrease in grain size. 7000 MPa was obtained for grain sizes of ≤40 nm. Annealing of compacts having smaller grain sizes than 50 nm at 1273 K for 4 h increases their grain size and hardness which are in the pos. Hall-Petch relation side. This fact indicates that ductile intermetallic compds. made by EDC having very small grain sizes can be then strengthened by annealing to increase their grain sizes beyond 60 nm.

IT **118435-58-8**
RL: USES (Uses)
(consolidation of mech. alloyed, by elec. discharge)
RN 118435-58-8 CAPLUS
CN Niobium alloy, base, Nb 54,Al 46 (9CI) (CA INDEX NAME)

Not For CAP.

Component	Component Percent	Component Registry Number
Nb	54	7440-03-1
Al	46	7429-90-5

IT **12004-70-5P**
RL: PREP (Preparation)
(preparation of, by mech. alloying and elec.-discharge consolidation)
RN 12004-70-5 CAPLUS
CN Aluminum, compd. with niobium (3:1) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number

Nb	1	7440-03-1
Al	3	7429-90-5

L12 ANSWER 20 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1992:203243 CAPLUS
DOCUMENT NUMBER: 116:203243

TITLE: **Electrolytic capacitors** produced from deformation-processed two-phase alloys

AUTHOR(S): Gibson, E. D.; Verhoeven, J. D.
CORPORATE SOURCE: Ames Lab., Iowa State Univ., Ames, IA, 50011, USA

SOURCE: Journal of Materials Science: Materials in Electronics (1991), 2(4), 236-43
CODEN: JSMEEV; ISSN: 0957-4522
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Arc cast Cu-Ta and powder processed Al-Ta and Al-Nb composite alloys were examined as potential materials for making **electrolytic capacitors**. These two phase alloys can be severely cold-worked, deformation-processed, to produce Ta surface areas considerably larger than those possible with the powder processing used in current Ta **capacitors**. The three alloys were deformation-processed into sheet and rod form and then processed through anodization electrolyte formation and cathode fabrication steps to make prototype **capacitors**. The **capacitors** were tested for capacitance, effective series resistance and leakage. The figure of merit, CVg-1, (capacitance + voltage per g) values obtained closely approached those of currently manufactured **capacitors** but d.c. leakage values were unacceptably high using a solid electrolyte. To realize the full potential of this new method for fabricating Al-Ta **capacitors** further research is required to improve the deformation of the Ta powders and to find methods of anodization and solid-state electrolyte formation capable of maintaining oxide film integrity.

IT **96340-68-0**
RL: RCT (Reactant); RACT (Reactant or reagent)
(anodization of, in ammonium citrate or phosphoric acid for **electrolytic capacitors**)
RN 96340-68-0 CAPLUS
CN Niobium alloy, base, Nb 76,Al 24 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	76	7440-03-1
Al	24	7429-90-5

IT **80207-84-7**
RL: RCT (Reactant); RACT (Reactant or reagent)
(anodization of, in phosphoric acid for **electrolytic capacitors**)
RN 80207-84-7 CAPLUS
CN Niobium alloy, base, Nb 91,Al 9.3 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	91	7440-03-1
Al	9.3	7429-90-5

L12 ANSWER 21 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1992:185986 CAPLUS
DOCUMENT NUMBER: 116:185986
TITLE: Contacts to semiconductors having zero resistance
INVENTOR(S): Jackson, Thomas Nelson; Kleinsasser, Alan Willis
PATENT ASSIGNEE(S): International Business Machines Corp., USA
SOURCE: Eur. Pat. Appl., 7 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
EP 460356	A2	19911211	EP 1991-102860		19910227
EP 460356	A3	19921104			
R: DE, FR, GB					
JP 07074403	A2	19950317	JP 1991-103714		19910314
PRIORITY APPLN. INFO.:			US 1990-534078	A	19900606

AB A FET includes a source electrode, a drain electrode, and a gate electrode elec. coupled to a body of semiconductor material. At least the drain electrode and the source electrode are each comprised of a material having superconducting properties below a predetd. temperature The source electrode and the drain electrode are each disposed relative to the body of semiconductor material for inducing, via the proximity effect, a superconducting state into adjacent material of the body of semiconductor material. As a result, a parasitic elec. resistance associated with the source electrode and the drain electrode is substantially or entirely eliminated. The source and drain electrodes may be comprised of low-temperature or of high temperature superconducting material.

IT **12003-75-7**
RL: TEM (Technical or engineered material use); USES (Uses)
(superconductive contact containing, for semiconductor device)

RN 12003-75-7 CAPLUS

CN Aluminum, compd. with niobium (1:3) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	3	7440-03-1
Al	1	7429-90-5

L12 ANSWER 22 OF 27 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1989:623755 CAPLUS

DOCUMENT NUMBER: 111:223755

TITLE: Aluminum alloy electrodes for **electrolytic capacitors**

INVENTOR(S): Mochizuki, Takashi; Takenoiri, Kazuo; Sekiguchi, Shoichi; Endo, Michio; Sukai, Tetsuya

PATENT ASSIGNEE(S): Nichicon Corp., Japan; Nippon Steel Corp.

SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 01124212	A2	19890517	JP 1987-282742	19871109
JP 08028312	B4	19960321		

PRIORITY APPLN. INFO.: JP 1987-282742 19871109

AB The title electrodes are Al alloys containing fine dispersions of intermetallic compds. of Al with Ti, Ta, Zr, Hf, and/or Nb. **Capacitors** having large electrostatic capacitance are prepared Thus, a foil prepared from Al-6 atomic% Zr alloy by rapid quenching was etched in aqueous HCl with d.c. application and then conversion treated to give a **capacitor** electrode.

IT **106933-67-9**
RL: USES (Uses)
(electrode, **capacitor**)

RN 106933-67-9 CAPLUS

CN Aluminum alloy, base, Al 93,Nb 6.6 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	93	7429-90-5
Nb	6.6	7440-03-1

L14 ANSWER 1 OF 1 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1998:6061212 INSPEC
DOCUMENT NUMBER: A1998-23-8120G-007
TITLE: Electro-discharge consolidation of nanocrystalline Nb-Al powders prepared by mechanical alloying
AUTHOR: Okazaki, K. (Dept. of Chem. & Mater. Eng., Kentucky Univ., Lexington, KY, USA)
SOURCE: THERMEC'97. International Conference on Thermomechanical Processing of Steels and Other Materials, vol.2, 1997, p. 1379-87 vol.2 of 2 vol. (xxxvi+xxviii+2397) pp., 13 refs.
Editor(s): Chandra, T.; Sakai, T.
ISBN: 0 87339 377 5
Published by: TMS, Warrendale, PA, USA
Conference: Proceedings of International Conference on Materials, Processing at High Temperature (THERMEC'97), Wollongong, NSW, Australia, 7-11 July 1997
Sponsor(s): U.S. Air Force Office for Sci. Res
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English
ABSTRACT: A 77 atomic%Nb-23 atomic%Al alloy was prepared by mechanical

alloying. Careful deconvolution of XRD revealed that the MA powder was a mixture of multi-phase nanocrystalline (5-9 nm) Nb3Al, Nb2Al, Nb and Al. This multi-phase powder under external pressure was subjected to a high-voltage, high-density current pulse from a capacitor bank to produce a consolidated bulk having a relative density of up to 97.5%. The consolidated bulk was still a mixture of two nanocrystalline (13-33 nm) Nb3Al and Nb2Al phases. Compression tests at ambient temperature exhibit the yield strength of 826 MPa and strain to fracture of 1.9%. An increase in temperature to 1233 K results in a decrease the yield strength to 500 MPa but an increase in ductility to more than 40%. The strain rate sensitivity m in Λlnσ/Δln.epsi
lon. was found to be greater than 0.4, suggesting that high temperature deformation may be controlled by grain rotation or grain boundary sliding

Not for CAP

CLASSIFICATION CODE: A8120G Preparation of metals and alloys (compacts, pseudoalloys); A6480G Microstructure; A8120E Powder techniques, compaction and sintering; A6220F Deformation and plasticity; A8140L Deformation, plasticity and creep; A6170L Slip, creep, internal friction and other indirect evidence of dislocations; A6220M Fatigue, brittleness, fracture, and cracks; A8140N Fatigue, embrittlement, and fracture

CONTROLLED TERM: aluminium alloys; discharges (electric); ductility; fracture; mechanical alloying; nanostructured materials; niobium alloys; powder metallurgy; powders; slip; X-ray diffraction; yield strength

SUPPLEMENTARY TERM: electro-discharge consolidation; nanocrystalline Nb-Al powders; mechanical alloying; XRD; multi-phase nanocrystalline Nb3Al; Nb2Al; multi-phase powder;

	high-voltage high-density current pulse; capacitor bank; consolidated bulk; compression tests; yield strength; ductility; strain rate sensitivity; high temperature deformation; grain boundary sliding; grain rotation; 1233 K; Nb3Al; Nb-Al
CHEMICAL INDEXING:	Nb3Al bin, Nb3 bin, Al bin, Nb bin; Nb2Al bin, Nb2 bin, Al bin, Nb bin; NbAl bin, Al bin, Nb bin
PHYSICAL PROPERTIES:	temperature 1.233E+03 K
ELEMENT TERMS:	Al*Nb; Al sy 2; sy 2; Nb sy 2; Nb-Al; **Nb3Al**; Nb cp; cp; Al cp; Al; Nb; **Nb2Al**

L19 ANSWER 1 OF 4 WPIX
ACCESSION NUMBER: 2005-201631 [21] WPIX
CROSS REFERENCE: 2004-498606 [47]
DOC. NO. NON-CPI: N2005-165958
DOC. NO. CPI: C2005-064276
TITLE: Fabrication of TFT-LCD comprises forming first metal layer, patterning first metal layer, forming gate-insulating layer, and forming semiconductor layer on the insulating layer.
DERWENT CLASS: L03 U11 U12 U14
INVENTOR(S): CHEN, M
PATENT ASSIGNEE(S): (CHEN-I) CHEN M
COUNTRY COUNT: 1
PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 2005037528	A1	20050217	(200521)*		10	H01L021-00

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 2005037528	A1 Div ex	US 2003-647885	20030825
		US 2004-947747	20040923

PRIORITY APPLN. INFO: TW 2002-137146 20021224
INT. PATENT CLASSIF.:
MAIN: H01L021-00
SECONDARY: H01L021-84
BASIC ABSTRACT:

US2005037528 A UPAB: 20050401
NOVELTY - Thin film transistor-liquid crystal display (TFT-LCD) is fabricated by forming first metal layer on a transparent substrate (100), patterning the first metal layer to form at least two adjacent gate electrodes, forming a gate insulating layer on the gate electrodes, and forming a semiconductor layer on the insulating layer.

DETAILED DESCRIPTION - Fabrication of thin film transistor-liquid crystal display comprises:

(a) forming first metal layer on a transparent substrate;
(b) patterning the first metal layer to form at least two adjacent gate electrodes;
(c) forming a gate insulating layer on the gate electrodes;
(d) forming a semiconductor layer on the insulating layer;
(e) depositing a second metal layer on the transparent substrate;
(f) patterning the second metal layer to form a source/drain electrode layer (330);
(g) depositing an insulating layer on the transparent substrate;
(h) defining a contact hole (340) via the insulating layer, source/drain electrode layer, and gate insulating layer, and exposing a part of the surface of transparent substrate between the adjacent gate electrodes;
(i) depositing a transparent conductive layer on the transparent substrate; and
(j) forming a light-shielding matrix (360) directly above the contact hole.

USE - For fabricating a TFT-LCD.

ADVANTAGE - Reduces the number of required photolithography steps in production of a TFT-LCD, shortens manufacturing time, increases throughput, and lowers the costs. The design in the formation of the gate electrodes on sides of the contact hole prevents over-etching of the contact holes, thus protecting the gate electrodes from short circuit. The light-shielding matrix directly above the contact hole prevents light leakage around the contact hole.

DESCRIPTION OF DRAWING(S) - The figure is a top view of a TFT-LCD.

Transparent substrate 100

Gate line area 310

Source/drain electrode layer 330

Contact hole 340

Indium tin oxide layer 350

Light-shielding matrix 360

Capacitor line 370

Gate line 380

Dwg.3/4

TECHNOLOGY FOCUS:

US 2005037528 A1UPTX: 20050401

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Process: The fabrication of TFT-LCD further includes providing a color filter at a predetermined distance above the transparent substrate. The light-shielding matrix directly above the contact hole is disposed on the color filter. The gate electrodes are separated from the contact hole. Preferred Component: The gate electrode is a molybdenum-aluminum-neodymium electrode. The source/drain electrode layer is aluminum aluminum-niobium, aluminum-**neodymium**, **aluminum**-titanium, or aluminum-silicon-copper layer. The gate-insulating layer is an oxide layer formed through chemical vapor deposition (CVD). The insulating layer is an oxide or nitride layer formed through CVD.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Process: The fabrication of TFT-LCD further includes providing a color filter at a predetermined distance above the transparent substrate. The light-shielding matrix directly above the contact hole is disposed on the color filter. The gate electrodes are separated from the contact hole. Preferred Component: The gate electrode is a molybdenum-aluminum-neodymium electrode. The source/drain electrode layer is aluminum aluminum-niobium, aluminum-**neodymium**, **aluminum**-titanium, or aluminum-silicon-copper layer. The gate-insulating layer is an oxide layer formed through chemical vapor deposition (CVD). The insulating layer is an oxide or nitride layer formed through CVD.

FILE SEGMENT: CPI EPI

FIELD AVAILABILITY: AB; GI

MANUAL CODES: CPI: L03-G05B6; L04-C06; L04-C11C1; L04-C12; L04-E01E
EPI: U11-C18A1; U12-B03A; U14-K01A1J

L19 ANSWER 4 OF 4 WPIX
ACCESSION NUMBER: 2003-329640 [31] WPIX
DOC. NO. NON-CPI: N2003-263756
DOC. NO. CPI: C2003-085674
TITLE: Dielectric ceramic composition for multilayered components, consists mixed oxide of lanthanum, **neodymium**, **aluminum** or yttrium, and neodymium or tantalum in specific mole fractions..
DERWENT CLASS: L03 V01 X12
INVENTOR(S): HONG, K S; KIM, D W; KIM, J Y; KWON, D G; PARK, J S; HONG, G S; KIM, D; KIM, J; KWON, D; PARK, J
PATENT ASSIGNEE(S): (HONG-I) HONG K S; (HONG-I) HONG G S; (KIMD-I) KIM D; (KIMJ-I) KIM J; (KWON-I) KWON D; (PARK-I) PARK J; (HONG-I) HONG K
COUNTRY COUNT: 2
PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 2003004051	A1	20030102	(200331)*		8	C04B035-495
KR 2002088527	A	20021129	(200331)			C04B035-50
US 6620750	B2	20030916	(200362)			C04B035-495
KR 426219	B	20040406	(200451)			H01G004-12

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 2003004051	A1	US 2001-945717	20010905
KR 2002088527	A	KR 2001-27158	20010518
US 6620750	B2	US 2001-945717	20010905
KR 426219	B	KR 2001-27158	20010518

FILING DETAILS:

PATENT NO	KIND		PATENT NO
KR 426219	B	Previous Publ.	KR 2002088527

PRIORITY APPLN. INFO: KR 2001-27158 20010518
INT. PATENT CLASSIF.:
MAIN: C04B035-495; C04B035-50; H01G004-12
SECONDARY: C04B035-505
BASIC ABSTRACT:
US2003004051 A UPAB: 20030516
NOVELTY - Dielectric ceramic composition comprises oxide(s) chosen from lanthanum trioxide, neodymium trioxide, alumina and yttrium trioxide and oxides(s) chosen from neodymium trioxide and tantalum oxide, in a molar ratio of 1:1. The ceramic composition comprises mixed oxide of lanthanum, **neodymium**, **aluminum** or yttrium, and neodymium or tantalum in specific mole fractions.

DETAILED DESCRIPTION - The dielectric ceramic composition comprises oxide(s) chosen from lanthanum trioxide, neodymium trioxide, alumina and yttrium trioxide and oxide(s) chosen from neodymium trioxide and tantalum oxide, in a molar ratio of 1:1. The dielectric composition is of formula: A'x A1-x B'y B1-y O4, where A' and A are lanthanum, neodymium, yttrium or aluminum, B' and B are neodymium or tantalum, x and y are mole fractions, and x is 0-1 and y is 0-1. An INDEPENDENT CLAIM is included for method for

manufacturing multilayered components.

USE - For manufacture of multilayered components (claimed) such as microwave oscillator, chip LC filters, chip duplexers, dielectric filter of personal communication service (PCS), temperature stable **capacitors** substrates and planar antenna and for fabrication of practical lamination portions.

ADVANTAGE - The dielectric ceramic composition has excellent temperature stability, low temperature sintering properties and high dielectric quality factor at low dielectric bonds. The dielectric ceramic composition is suitable for high frequency bonds such as microwave and millimetric wave.

Dwg.0/0

FILE SEGMENT:	CPI EPI
FIELD AVAILABILITY:	AB
MANUAL CODES:	CPI: L03-B03E; L03-D01; L03-D04D
	EPI: V01-B03A1; V01-B03C3A; X12-E01A

L25 ANSWER 6 OF 7 CAPLUS
ACCESSION NUMBER: 1994:635799 CAPLUS
DOCUMENT NUMBER: 121:235799
TITLE: Synthesis of intermetallics by mechanical alloying
AUTHOR(S): Suryanarayana, C.; Froes, F. H.; Mukhopadhyay, D. K.; Cizmich, G.; Chen, G. H.; Peng, Z.; Mishurda, J.
CORPORATE SOURCE: Inst. Mater. Adv. Process., Univ. Idaho, Moscow, ID, 83844-3026, USA
SOURCE: Process Fabr. Adv. Mater. III, Proc. Symp., 3rd (1994), Meeting Date 1993, 567-84. Editor(s): Ravi, V. A.; Srivatsan, T. S.; Morre, J. J. Miner. Met. Mater. Soc.: Warredale, Pa.
CODEN: 60MIAQ
DOCUMENT TYPE: Conference
LANGUAGE: English
AB Mech. alloying is a solid-state powder processing technique to synthesize a variety of alloy phases including supersatd. solid solns., intermetallic compds., and amorphous phases. The application of mech. alloying to the synthesis of intermetallics can overcome the difficulties of mixing two metals with significantly different m.ps., narrow homogeneity ranges of some intermetallics, and the high reactivities of some metals. The paper describes the synthesis of intermetallics in the Ti-Al, Fe-Al, and Nb-Al systems with an ultrafine **microstructure**. HIP consolidation of some of these materials has demonstrated that they retain the nanostructures and possess high hardness and strength.
IT **12003-74-6P**, AlNb2 **12003-75-7P**, AlNb3
12004-70-5P, Al3Nb
RL: SPN (Synthetic preparation); PREP (Preparation)
(mech. alloying synthesis of)
RN 12003-74-6 CAPLUS
CN Aluminum, compd. with niobium (1:2) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	2	7440-03-1
Al	1	7429-90-5

RN 12003-75-7 CAPLUS
CN Aluminum, compd. with niobium (1:3) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	3	7440-03-1
Al	1	7429-90-5

RN 12004-70-5 CAPLUS
CN Aluminum, compd. with niobium (3:1) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	1	7440-03-1
Al	3	7429-90-5

IT **51602-53-0** **60817-72-3**, Aluminum 25, niobium 75 (atomic)
60817-74-5, Aluminum 30, niobium 70 (atomic) **78337-79-8**,

Aluminum 24, niobium 11, titanium 65 (atomic) **86666-37-7**, Aluminum 10, niobium 90 (atomic) **111235-22-4**, Aluminum 75, niobium 25 (atomic) **119263-46-6 121419-96-3**, Aluminum 50, niobium 50 (atomic) **124307-32-0**, Aluminum 25, niobium 25, titanium 50 (atomic) **125221-67-2**, Aluminum 37.5, niobium 12.5, titanium 50 (atomic) **131568-74-6 137322-66-8**, Aluminum 35, niobium 65 (atomic) **158472-85-6 158472-86-7**
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(synthesis of intermetallics by mech. alloying of)

RN 51602-53-0 CAPLUS
CN Niobium alloy, base, Nb 95,Al 4.9 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	95	7440-03-1
Al	4.9	7429-90-5

RN 60817-72-3 CAPLUS
CN Niobium alloy, base, Nb 91,Al 8.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	91	7440-03-1
Al	8.8	7429-90-5

RN 60817-74-5 CAPLUS
CN Niobium alloy, base, Nb 89,Al 11 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	89	7440-03-1
Al	11	7429-90-5

RN 78337-79-8 CAPLUS
CN Titanium alloy, base, Ti 65,Nb 21,Al 14 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	65	7440-32-6
Nb	21	7440-03-1
Al	14	7429-90-5

RN 86666-37-7 CAPLUS
CN Niobium alloy, base, Nb 97,Al 3.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	97	7440-03-1
Al	3.1	7429-90-5

RN 111235-22-4 CAPLUS
CN Niobium alloy, base, Nb 53,Al 47 (9CI) (CA INDEX NAME)

Component Component Component

	Percent	Registry Number
Nb	53	7440-03-1
Al	47	7429-90-5

RN 119263-46-6 CAPLUS
CN Niobium alloy, base, Nb 63,Al 37 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	63	7440-03-1
Al	37	7429-90-5

RN 121419-96-3 CAPLUS
CN Niobium alloy, base, Nb 77,Al 23 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	77	7440-03-1
Al	23	7429-90-5

RN 124307-32-0 CAPLUS
CN Titanium alloy, base, Ti 44,Nb 43,Al 13 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	44	7440-32-6
Nb	43	7440-03-1
Al	13	7429-90-5

RN 125221-67-2 CAPLUS
CN Titanium alloy, base, Ti 52,Nb 25,Al 22 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	52	7440-32-6
Nb	25	7440-03-1
Al	22	7429-90-5

RN 131568-74-6 CAPLUS
CN Titanium alloy, base, Ti 43,Nb 42,Al 15 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	43	7440-32-6
Nb	42	7440-03-1
Al	15	7429-90-5

RN 137322-66-8 CAPLUS
CN Niobium alloy, base, Nb 86,Al 14 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number

Nb	86	7440-03-1
Al	14	7429-90-5

RN 158472-85-6 CAPLUS
CN Aluminum alloy, base, Al 62,Nb 38 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	62	7429-90-5
Nb	38	7440-03-1

RN 158472-86-7 CAPLUS
CN Niobium alloy, base, Nb 84,Al 16 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	84	7440-03-1
Al	16	7429-90-5

L25 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1995:469055 CAPLUS
DOCUMENT NUMBER: 122:271085
TITLE: Synthesis of intermetallics by mechanical alloying
AUTHOR(S): Froes, F. H. (Sam); Suryanarayana, C.; Russell, K.; Li, C.-G.
CORPORATE SOURCE: Institute for Materials and Advanced Processes (IMAP), University of Idaho, Moscow, ID, 83844-3026, USA
SOURCE: Materials Science & Engineering, A: Structural Materials: Properties, Microstructure and Processing (1995), A192/193, 612-23
CODEN: MSAPE3; ISSN: 0921-5093
PUBLISHER: Elsevier
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Mech. alloying (MA), a solid-state powder processing method, is a 'far from equilibrium' synthesis technique which allows the development of novel crystal structures and **microstructures**, leading to enhanced phys. and mech. properties. The application of MA to the synthesis of intermetallics in the Ti-Al(-Nb), Al-Fe, Nb-Al, Ti-Mg, Al-Zr(-Fe) and Al-Mg systems is presented. The ability to synthesize a variety of alloy phases, including supersatd. solid solns., nanocryst. structures, amorphous phases and intermetallic compds. themselves, is discussed. No extension of solubility using MA was observed in the intermetallics studied, unlike the situation using rapid solidification (RS). Nanostructured grains were observed in all compns., their rate of decrease in size and min. size being related to the following partially interrelated parameters: stability of the intermetallic, grain boundary energy, m.p. and the balance between defect creation/recovery. Long-time milling generally resulted in amorphous phase formation largely because of the increase in grain boundary energy per mol with reduced grain size; good agreement with the Miedema model for amorphization was obtained in the Al-Fe system. Generally, annealing was required to form the intermetallic after MA; however, intermetallics with a large neg. enthalpy of formation were detected in the mech. alloyed condition. Low-temperature compaction allowed the retention of the fine **microstructure** in the nanometer range, giving an interesting capability to enhance ductility in the normally brittle intermetallics.

IT **42611-20-1P 60817-72-3P**, Aluminum 25, niobium 75 (atomic) **111235-22-4P**, Aluminum 75, niobium 25 (atomic) **121419-96-3P**, Aluminum 50, niobium 50 (atomic) **126185-23-7P 132985-48-9P**, Aluminum 33, niobium 67 (atomic) **140678-21-3P 158472-85-6P**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(mech.-alloyed; amorphous phase formation in)

RN 42611-20-1 CAPLUS
CN Niobium alloy, base, Nb 60,Al 40 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	60	7440-03-1
Al	40	7429-90-5

RN 60817-72-3 CAPLUS
CN Niobium alloy, base, Nb 91,Al 8.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	91	7440-03-1
Al	8.8	7429-90-5

RN 111235-22-4 CAPLUS
CN Niobium alloy, base, Nb 53,Al 47 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	53	7440-03-1
Al	47	7429-90-5

RN 121419-96-3 CAPLUS
CN Niobium alloy, base, Nb 77,Al 23 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	77	7440-03-1
Al	23	7429-90-5

RN 126185-23-7 CAPLUS
CN Niobium alloy, base, Nb 65,Al 35 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	65	7440-03-1
Al	35	7429-90-5

RN 132985-48-9 CAPLUS
CN Niobium alloy, base, Nb 87,Al 13 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	87	7440-03-1
Al	13	7429-90-5

RN 140678-21-3 CAPLUS
CN Niobium alloy, base, Nb 70,Al 30 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	70	7440-03-1
Al	30	7429-90-5

RN 158472-85-6 CAPLUS
CN Aluminum alloy, base, Al 62,Nb 38 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	62	7429-90-5

Nb	38	7440-03-1

IT **78337-79-8P**, Aluminum 24, niobium 11, titanium 65 (atomic)
124307-32-0P, Aluminum 25, niobium 25, titanium 50 (atomic)
125221-67-2P, Aluminum 37.5, niobium 12.5, titanium 50 (atomic)
131568-74-6P, Aluminum 28.5, niobium 23.9, titanium 47.6 (atomic)
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(mech.-alloyed; nanostructured grain and amorphous phase formation in)

RN 78337-79-8 CAPLUS
CN Titanium alloy, base, Ti 65,Nb 21,Al 14 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	65	7440-32-6
Nb	21	7440-03-1
Al	14	7429-90-5

RN 124307-32-0 CAPLUS
CN Titanium alloy, base, Ti 44,Nb 43,Al 13 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	44	7440-32-6
Nb	43	7440-03-1
Al	13	7429-90-5

RN 125221-67-2 CAPLUS
CN Titanium alloy, base, Ti 52,Nb 25,Al 22 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	52	7440-32-6
Nb	25	7440-03-1
Al	22	7429-90-5

RN 131568-74-6 CAPLUS
CN Titanium alloy, base, Ti 43,Nb 42,Al 15 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	43	7440-32-6
Nb	42	7440-03-1
Al	15	7429-90-5

IT **12003-74-6P 12003-75-7P 12004-70-5P**
RL: PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation)
(structure and properties of intermetallics in mech.-alloyed Nb-Al system alloys)

RN 12003-74-6 CAPLUS
CN Aluminum, compd. with niobium (1:2) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	2	7440-03-1

Al	1	7429-90-5

RN 12003-75-7 CAPLUS
CN Aluminum, compd. with niobium (1:3) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	3	7440-03-1
Al	1	7429-90-5

RN 12004-70-5 CAPLUS
CN Aluminum, compd. with niobium (3:1) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	1	7440-03-1
Al	3	7429-90-5

L25 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:325498 CAPLUS
DOCUMENT NUMBER: 133:20795
TITLE: The effect of excess aluminum on the composition and **microstructure** of Nb-Al alloys produced by aluminothermic reduction of Nb2O5
AUTHOR(S): Ramos, Alfeu S.; Nunes, Carlos A.
CORPORATE SOURCE: Departamento de Engenharia de Materiais, FAENQUIL, Polo Urbo Industrial, Lorena, 12600-000, Brazil
SOURCE: Journal of Materials Synthesis and Processing (1999), 7(5), 297-301
CODEN: JMSPEI; ISSN: 1064-7562
PUBLISHER: Kluwer Academic/Plenum Publishers
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Intermetallic aluminides including those phases of the Nb-Al system are of interest for high-temperature structural applications. Through aluminothermic reduction (ATR) of Nb2O5 different alloys of the Nb-Al system can be produced by varying the amount of aluminum (excess aluminum) in the thermit charge. In this work, various Nb-Al alloys were produced by varying Nb2O5 and Al powder blends. The resulting alloys were characterized by chemical anal. (Al, O, and C), X-ray diffraction and SEM. The aluminum content of the alloys increased linearly from 14.5 to 50.4 atomic% as the excess Al was varied from 10 up to 60% over the stoichiometric amount to reduce the Nb2O5. The carbon content was lower than 300 wt-ppm. The oxygen content decreases with increasing excess Al, reaching 1300 wt-ppm for the alloy produced with 60% excess Al. The inclusion content (Al2O3) decreases significantly as the excess Al is increased. The following metallic phases were identified in the alloys: Nbss (niobium solid solution) and Nb3Al (alloy produced with 10% excess Al); Nb3Al (alloys produced with 15 and 20% excess Al); Nb3Al, Nb2Al, and NbAl3 (alloy produced with 30% excess Al); and Nb2Al and NbAl3 (alloys produced with 40, 50, and 60% excess Al).
IT **12003-74-6P 12003-75-7P 12004-70-5P**
111235-60-0P, Aluminum 15.4, niobium 84.6 (atomic)
RL: SPN (Synthetic preparation); PREP (Preparation)
(effect of excess aluminum on composition and **microstructure** of Nb-Al alloys produced by aluminothermic reduction of Nb2O5)
RN 12003-74-6 CAPLUS
CN Aluminum, compd. with niobium (1:2) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	2	7440-03-1
Al	1	7429-90-5

RN 12003-75-7 CAPLUS
CN Aluminum, compd. with niobium (1:3) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	3	7440-03-1
Al	1	7429-90-5

RN 12004-70-5 CAPLUS
CN Aluminum, compd. with niobium (3:1) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	1	7440-03-1
Al	3	7429-90-5

RN 111235-60-0 CAPLUS
CN Niobium alloy, base, Nb 95,Al 5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Nb	95	7440-03-1
Al	5	7429-90-5

REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L25 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:701723 CAPLUS
DOCUMENT NUMBER: 134:24348
TITLE: RF magnetron sputtering target for Nb3Al made by powder metallurgy
AUTHOR(S): Agatsuma, K.; Tateishi, H.; Arai, K.; Saitoh, T.; Futaki, N.
CORPORATE SOURCE: Electrotechnical Laboratory, Ibaraki, Japan
SOURCE: Institute of Physics Conference Series (2000), 167(Applied Superconductivity 1999, Vol. 1), 1179-1182
CODEN: IPCSEP; ISSN: 0951-3248
PUBLISHER: Institute of Physics Publishing
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The authors have attempted to make a single target out of the mixed powder of Nb and stable Nb-Al compound powder to avoid difference in stoichiometry. The authors use a stable Nb-Al compound, which consists of the pressed powder of Nb and NbAl3, or Nb2Al mixture Thin Nb3Al films on MgO and Al2O3 substrate were made using these targets. The thin films on MgO and Al2O3 substrate made with these targets show supercond. The exptl. results are presented.

IT **7440-03-1**, Niobium, processes **12003-74-6** **12003-75-7** **12004-70-5**
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(RF magnetron sputtering target for Nb3Al made by powder metallurgy)

RN 7440-03-1 CAPLUS
CN Niobium (8CI, 9CI) (CA INDEX NAME)

Nb

RN 12003-74-6 CAPLUS
CN Aluminum, compd. with niobium (1:2) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	2	7440-03-1
Al	1	7429-90-5

RN 12003-75-7 CAPLUS
CN Aluminum, compd. with niobium (1:3) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	3	7440-03-1
Al	1	7429-90-5

RN 12004-70-5 CAPLUS
CN Aluminum, compd. with niobium (3:1) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	1	7440-03-1

05/19/2006 10/534703 Thomas

Al	3	7429-90-5

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L25 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2002:408022 CAPLUS
DOCUMENT NUMBER: 137:188911
TITLE: Microstructural analysis and mechanical properties of in situ Nb/Nb-aluminide layered materials
AUTHOR(S): Chung, Dong-Seok; Enoki, Manabu; Kishi, Teruo
CORPORATE SOURCE: Department of Materials, Changwon Polytechnic College, Changwon, Kyungnam, 641-772, S. Korea
SOURCE: Science and Technology of Advanced Materials (2002), 3(2), 129-135
CODEN: STAMCV; ISSN: 1468-6996
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Thin foil hot press process was developed for manufacturing metal/intermetallic compound laminate composites to induce self-propagating high-temperature synthesis (SHS) reaction between different pure metal sheets. In the present work, Nb/Nb-aluminide laminate composites were manufactured with pure Nb and Al sheets, which consist of fine Nb/Nb2Al/NbAl3 or Nb/Nb3Al/Nb2Al/NbAl3 layer structure. Microvickers hardness test and energy dispersive x-ray spectroscopy (EDS) anal. in the intermetallic compound layer demonstrate the formation of various phases, and the microvickers hardness values decrease with increasing Al/Nb atomic ratio. Although the tensile strength of laminate composites is similar to pure Nb, ductility and fracture toughness are significantly improved due to plastic deformation in Nb layer.

IT **12003-74-6 12003-75-7 12004-70-5**
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(microstructural anal. and mech. properties of in situ Nb/Nb-aluminide layered materials)

RN 12003-74-6 CAPLUS
CN Aluminum, compd. with niobium (1:2) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	2	7440-03-1
Al	1	7429-90-5

RN 12003-75-7 CAPLUS
CN Aluminum, compd. with niobium (1:3) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	3	7440-03-1
Al	1	7429-90-5

RN 12004-70-5 CAPLUS
CN Aluminum, compd. with niobium (3:1) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
Nb	1	7440-03-1
Al	3	7429-90-5

IT **7440-03-1**, Niobium, properties **37254-86-7**
RL: PRP (Properties)
(microstructural anal. and mech. properties of in situ Nb/Nb-aluminide layered materials)
RN 7440-03-1 CAPLUS
CN Niobium (8CI, 9CI) (CA INDEX NAME)

Nb

RN 37254-86-7 CAPLUS
CN Aluminum alloy, base, Al 0-100,Nb 0-100 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	0 - 100	7429-90-5
Nb	0 - 100	7440-03-1

REFERENCE COUNT: 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP03/14556

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl^7 B22F1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl^7 B22F1/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1926-1996	Toroku Jitsuyo Shinan Koho	1994-2002
Kokai Jitsuyo Shinan Koho	1971-2002	Jitsuyo Shinan Toroku Koho	1996-2002

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 60-066806 A (Nippon Condenser Kogyo Kabushiki Kaisha), 17 April, 1985 (17.04.85), Claims; page 2, lower right column; page 3, upper right column (Family: none)	1-14
Y	JP 01-124212 A (Nichicon Corp.), 17 May, 1989 (17.05.89), Claims; page 2, lower part; page 3, upper left column (Family: none)	1-14
Y	US 3564348 A (Sprague Electric Co.), 16 February, 1971 (16.02.71), Column 2, lines 24 to 30 (Family: none)	1-14

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search 10 December, 2003 (10.12.03)	Date of mailing of the international search report 24 December, 2003 (24.12.03)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

United States Patent

[11] 3,564,348

[72] Inventor David M. Cheseldine
Bennington, Vt.
[21] Appl. No. 814,089
[22] Filed Apr. 7, 1969
[45] Patented Feb. 16, 1971
[73] Assignee Sprague Electric Company
North Adams, Mass.
a corporation of Massachusetts

[54] TITANIUM-ANTIMONY ALLOY ELECTRODE ELECTRICAL CAPACITOR
3 Claims, 1 Drawing Fig.

[52] U.S. Cl. 317/230, 317/238
[51] Int. Cl. H01g 9/05
[50] Field of Search 317/230, 231, 232, 233, 258

[56] References Cited
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2,299,228	10/1942	Gray et al.	317/230
2,504,178	4/1950	Burnham et al.	317/230
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3,126,503	3/1964	Salomon	317/230
3,255,389	6/1966	Salomon et al.	317/230
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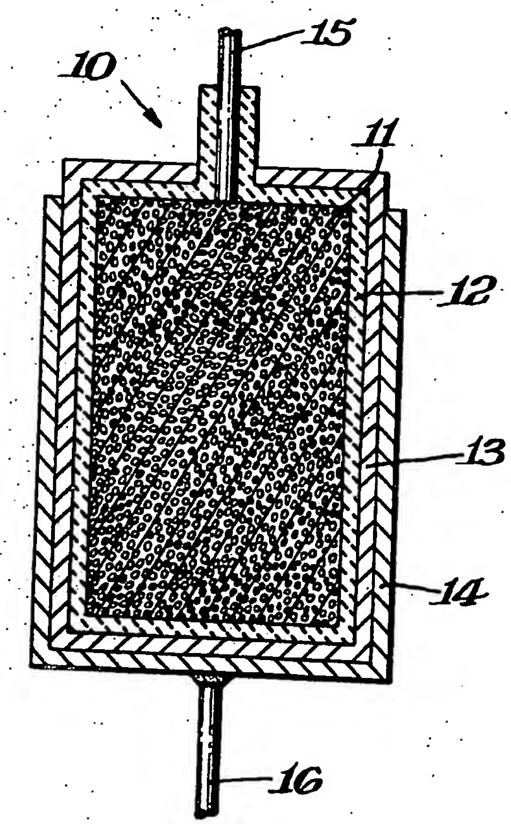
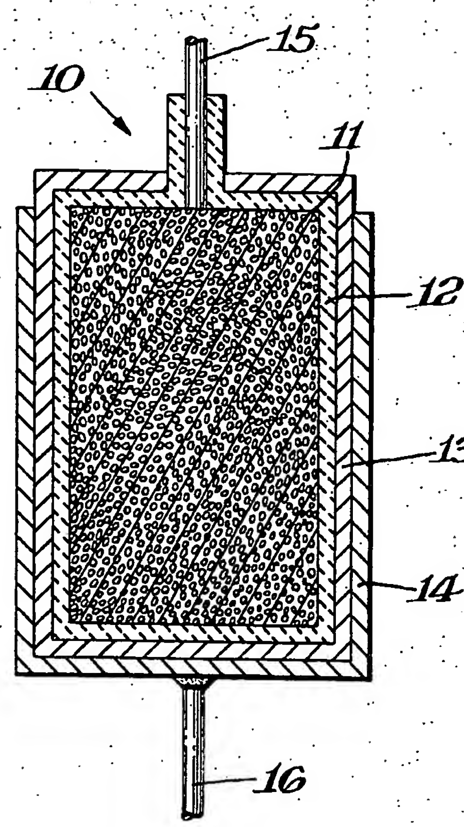
Primary Examiner—James D. Kallam
Attorneys—Connolly and Hutz, Vincent H. Sweeney, James Paul O'Sullivan and David R. Thornton

ABSTRACT: An electrical capacitor is provided having at least one electrode comprising an alloy of titanium and antimony. An antimony concentration of 10 to 30 percent by weight provides an electrode material on which a stable anodic film is grown, such film being characterized by good thermal and electrical stability.

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TITANIUM-ANTIMONY ALLOY ELECTRODE ELECTRICAL CAPACITOR

BACKGROUND OF THE INVENTION

This invention relates to electrolytic capacitors and more particularly to a capacitor having an anodic oxide dielectric formed on an alloy of titanium and antimony.

Heretofore, the elemental metals aluminum and tantalum have been widely used as dielectric oxide film-forming electrodes in the making of electrolytic capacitors. Tantalum oxide has a high dielectric constant and hence high capacity per unit area, good mechanical strength and excellent chemical resistance for both oxide and metal. However, tantalum has the disadvantage of relatively high cost and greater weight. Aluminum is low in cost, has a low density and is easily etched to increase the surface area. However, aluminum has a relatively lower dielectric constant, poorer mechanical strength and lower resistance to corrosion than tantalum.

While anodic films may be grown on many other materials, none are presently being used in making electrolytic capacitors because of poor electrical and thermal stability of the films produced. Titanium is one of the materials considered for such use in view of the high dielectric constant of its oxide and its good corrosion resistance, low density and relatively low cost. However, it has been found that continuous oxide films for dielectric purposes cannot readily be formed to acceptable voltage levels on the titanium metal by conventional anodizing methods such as used in connection with aluminum and tantalum. For example, during the anodization, the film stops growing uniformly and gas evolution occurs at points on the surface at voltages well below 100 volts. Furthermore, even when an electrolyte does form higher voltage films the dielectric films are not electrically stable. They exhibit a tendency for capacity to increase with time and to show a strong dependence on bias voltage.

In an attempt to form oxides at higher voltage levels, various elements such as palladium, niobium, tantalum, tin, boron, vanadium, chromium and aluminum have been alloyed with titanium but the anodic films formed on such alloys usually suffer from one or more defects such as instability with heat or DC bias, high dissipation factors or high leakage current.

It is therefore an object of the present invention to provide capacitors having electrodes which can be anodized to form dielectric films without the above cited disadvantages.

It is another object to provide an electrode for such a capacitor on which anodic films may be grown over a wide range of thicknesses.

SUMMARY OF THE INVENTION

Broadly this invention concerns electric capacitors having novel anodic film-forming electrodes. More particularly, such electrodes comprise an alloy of titanium and antimony. It has been found that a stable anodic film can be grown on such an alloy composition thereby providing films having relatively high capacity compared to aluminum oxide but somewhat below that of tantalum oxide. An optimum titanium composition by weight has been found to fall within 70 to 90 percent. The alloy composition is considerably cheaper and lighter than tantalum yet offers comparable mechanical strength and chemical resistance; the anodic films formed thereon can be produced in conventional aqueous electrolytes or in organic electrolytes. These films are further characterized by uniform interference colors, high breakdown voltages, low electronic leakage currents and low dissipation factors.

BRIEF DESCRIPTION OF THE DRAWING

The sole drawing shows a solid electrolyte capacitor in which the novel electrode is embodied.

DETAILED DESCRIPTION OF THE INVENTION

In accordance with the present invention, an alloy of titanium and antimony is prepared by any preferred means. This alloy is then processed, using standard metallurgical techniques, to the required anode shape depending on the form of the capacitor it is desired to make. Common forms of electrolytic capacitors use anodes shaped as thin foils, wires or pellets consisting of sintered particles. The shaped alloy is then anodized in any suitable electrolyte to form the high-quality dielectric film which is a feature of the invention. The capacitor unit may be completed by combination with a "wet" or "solid" electrolyte and by adding another electrode.

Referring to the drawing, there is shown a solid electrolyte capacitor **10** with an anode **11** composed of the sintered titanium alloy of (80 invention as 20 more fully described. A dielectric oxide film **12** is formed on the surface of the anode and a coating **13** of a suitable solid electrolyte such as manganese dioxide overlies dielectric oxide film **12**. The cathode electrode **14** is formed by coating the outer surface of the electrolyte with an appropriate metal such as silver. A film-forming lead wire **15** made from the alloy or any other film-forming metal contacts anode **11**. A cathode lead **16** is suitably joined by welding or otherwise connecting the lead to electrode **14**. The entire unit is then encapsulated with a preferred sealant (not shown).

The alloy of which anode **11** is composed was prepared in an arc furnace by mixing the powders of the constituent metals (80 percent titanium, 20 percent antimony by weight in this embodiment) and melting the mixture in an inert atmosphere by striking an arc between a mobile tungsten electrode and the powder mixture. The anode is formed by well-known powder metallurgy techniques wherein the spherical particles of the alloy are compressed and sintered into a compact mass.

Other means of preparing the alloy are available however, e.g. vacuum induction melting and sintering. The method of alloy preparation does not constitute any part of this invention.

Tests have been made to determine the characteristics of alloys of differing composition than the example above. It has been found that a composition comprising above 90 percent by weight of titanium, while anodizing to a higher voltage than pure titanium, formed less stable films. At 70 percent by weight of titanium, the composition gave a rather nonhomogeneous alloy on which it was difficult to obtain a good surface. On compositions comprising less than 70 percent of titanium, the alloy tended to become brittle and to crack during solidification. An optimum composition range would therefore be 70 to 90 percent by weight of titanium.

The following examples illustrate the dielectric properties of anodic films which may be formed on an alloy containing 20 percent of antimony.

The alloy was anodized to 90 volts in an aqueous solution of 10 percent phosphorous acid at 25° C. using a current density of 0.6 ma./cm^2. Almost any other electrolyte may be used which does not attack the film and which is sufficiently dilute so that the oxide film does not break down due to scintillation at the anodizing voltage. The final voltage was held for 45 minutes until the current decayed to 15 μa/cm^2. When measured in a solution of 10 percent ammonium dihydrogen phosphate, the film showed a capacity of 0.14 μf/cm^2 or a capacity voltage product (CV) of 12.5 μf-v./cm^2. This compares with a CV of about 14 μf-v./cm^2 for tantalum and 6.5 μf-v./cm^2 for aluminum. The dissipation factor in the same solution was 1.2 percent at 120 cycles. The electrode was then immersed for a period of 1 month in a working electrolyte at 85° and 47 VDC applied against a tantalum cathode. After an initial period of 3 days the leakage current stabilized at a steady value of about $3 \times 10^{-3}\mu$a/cm^2. Periodic measurements of capacity and dissipation factor showed no significant changes. The dissipation factor remained at about 1 percent while the change in capacity, measured both at zero and 50 VDC bias, was less than 3 percent.

As a further example the alloy of the present invention was anodized in 0.01 MH_3PO_4 at voltages up to 350 v. The film formed at the upper end of the voltage range still showed a

bright interference color with no noticeable surface gas evolution. By comparison, titanium anodized under similar conditions broke down at about 20 v. and showed irregular interference colors and gas evolution prior to breakdown.

While the above example has described a capacitor having a sintered anode formed of the described alloy mixture, it is understood that the novel electrode could be formed as a foil or wire depending upon the capacitor configuration and use. And instead of a solid electrolyte any preferred "wet" electrolyte solution may be used and enclosed within the appropriate casing.

I claim:

1. An electrical capacitor comprising spaced electrodes, at least one of said electrodes being an alloy of titanium and antimony, said at least one electrode having an anodic dielectric oxide film formed thereon and disposed between said electrodes.

2. A capacitor as described in claim 1 wherein titanium is present in the alloy in the amount of 70—90 percent by weight.

3. A capacitor as described in claim 1 wherein said at least one electrode is a sintered mass of particles of said alloy and wherein a layer of semiconductive material overlies said dielectric oxide film.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,564,348 Dated February 16, 1971

Inventor(s) David M. Cheseldine

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 12, omit "(80 invention as 20" and insert -- the invention as hereinafter --
Column 2, line 65, change "85^{o}" to -- 85^{o}C --
Column 3, line 3, change "20" to -- 70 --

Signed and sealed this 13th day of July 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents